WATER VAPOR DISTILLATION APPARATUS, METHOD AND SYSTEM

CROSS REFERENCE TO RELATED APPLICATION(S)

[0001] The present application is a Continuation of U.S. patent application Ser. No. 14/856,828, filed Sep. 17, 2015 and entitled Water Vapor Distillation Apparatus, Method and System now U.S. Pat. No. 10,689,263 issued Jun. 23, 2020 (Attorney Docket No. Q72), which is a Non-Provisional Application which claims priority from U.S. Provisional Patent Application Ser. No. 62/051,646, filed Sep. 17, 2014 and entitled Water Vapor Distillation Apparatus, Method and System (Attorney Docket No. M98), which is hereby incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] The present invention relates to water distillation and more particularly, to a water vapor distillation apparatus, method, and system.

BACKGROUND INFORMATION

[0003] A dependable source of clean water eludes vast segments of humanity. For example, the Canadian International Development Agency reports that about 1.2 billion people lack access to safe drinking water. Published reports attribute millions and millions of deaths per year, mostly children, to water related diseases. Many water purification techniques are well known, including carbon filters, chlorination, pasteurization, and reverse osmosis. Many of these techniques are significantly affected by variations in the water quality and do not address a wide variety of common contaminants, such as bacteria, viruses, organics, arsenic, lead, mercury, and pesticides that may be found in water supplies in the developing world and elsewhere. Some of these systems require access to a supply of consumables, such as filters or chemicals. Moreover, some of these techniques are only well suited to centralized, large-scale water systems that require both a significant infrastructure and highly trained operators. The ability to produce reliable clean water without regard to the water source, on a smaller, decentralized scale, without the need for consumables and constant maintenance is very desirable, particularly in the developing world. The use of vapor compression distillation to purify water is well known and may address many of these concerns. However, the poor financial resources, limited technical assets, and low population density that does not make it feasible to build centralized, large-scale water systems in much of the developing world, also limits the availability of adequate, affordable, and reliable power to operate vapor compression distillation systems, as well as hindering the ability to properly maintain such systems. In such circumstances, an improved vapor compression distillation system and associated components that increases efficiency and production capability, while decreasing the necessary power budget for system operation and the amount of system maintenance required may provide a solution.

SUMMARY

[0004] In accordance with one aspect of the present invention, a system for water dispensing is disclosed. The system includes a housing comprising a first and second portion; a water vapor distillation apparatus housed in the first portion of the housing, the water vapor distillation apparatus producing a distilled water product; at least one storage tank housed in the second portion of the housing and fluidly connected to the water vapor distillation apparatus; at least one pump housed in the second portion of the housing and fluidly connected to the at least one storage tank; and at least one appliance located outside of the housing and fluidly connected to the at least one pump, wherein the distilled water product is stored in the at least one storage tank and the pump pumps water from the at least one storage tank to the at least one appliance. Some embodiments may include one or more of the following: wherein the housing comprising a cabinet and a counter; further including at least one electronics box housed in the second portion of the housing; further including at least one chiller housed in the second portion of the housing; further including at least one sensor in the at least one storage tank; wherein the at least one sensor comprising a volume full sensor; wherein the at least one sensor comprising an empty tank sensor; wherein the at least one sensor comprising a volume full sensor and a empty tank sensor, wherein the volume full sensor and the empty tank sensor are switches with hysteresis; wherein when the volume full sensor and empty tank sensor indicate the storage tank is below a threshold, the volume full sensor or empty tank sensor turns the water vapor distillation apparatus on; wherein when the volume full sensor and empty tank sensor indicate the storage tank is above a threshold, the volume full sensor or empty tank sensor turns the water vapor distillation apparatus off; wherein the second section further comprising an accumulator; wherein the at least one pump pumps water from the storage tank to the accumulated and then into a chiller.

[0005] In accordance with one aspect of the present invention, a system for water dispensing is disclosed. The system includes a housing including a first and second portion, a water vapor distillation apparatus housed in the first portion of the housing, the water vapor distillation apparatus producing a distilled water product, at least one storage tank housed in the second portion of the housing and fluidly connected to the water vapor distillation apparatus, an accumulator housing in the second portion of the housing and fluidly connected to the at least one storage tank, at least one pump housed in the second portion of the housing and fluidly connected to the at least one storage tank and the accumulator, and at least one appliance located outside of the housing and fluidly connected to the at least one pump, wherein the distilled water product is stored in the at least one storage tank and the pump pumps water from the at least one storage tank to the at least one appliance.

[0006] Some embodiments may include one or more of the following: wherein the housing comprising a cabinet and a counter; further including at least one electronics box housed in the second portion of the housing; further including at least one chiller housed in the second portion of the housing; further including at least one sensor in the at least one storage tank; wherein the at least one sensor comprising a volume full sensor; wherein the at least one sensor comprising an empty tank sensor; wherein the at least one sensor comprising a volume full sensor and a empty tank sensor, wherein the volume full sensor and the empty tank sensor are switches with hysteresis; wherein when the volume full sensor and empty tank sensor indicate the storage tank is below a threshold, the volume full sensor or